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DATE: Monday, April 26, 2004

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☐	L15	19890811	235
☐	L14	L13 and l10	9164
☐	L13	L11 and (bacillus or bacill$7)	17992
☐	L12	L11 and (alkaline or alkal$7)	34247
☐	L11	protease or proteinase	59497
☐	L10	L9 or l8 or l7 or l6 or l5 or l4 or l3 or l2 or l1	31590
☐	L9	(536/23.2)!.ccls.	10770
☐	L8	(435/463)!.ccls.	228
☐	L7	(435/440)!.ccls.	616
☐	L6	(435/320.1)!.ccls.	23353
☐	L5	(435/252.31)!.ccls.	705
☐	L4	(435/252.3)!.ccls.	8089
☐	L3	(435/219)!.ccls.	918
☐	L2	(435/212)!.ccls.	778
☐	L1	(435/69.1)!.ccls.	17404

END OF SEARCH HISTORY

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L19 ANSWER 1 OF 30 HCAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 1991:443482 HCAPLUS
Correction of: 1985:180203
DOCUMENT NUMBER: 115:43482
Correction of: 102:180203
TITLE: Recombinant manufacture of prokaryotic carbonyl hydrolases for use in detergents
INVENTOR(S): Bott, Richard Ray; Ferrari, Eugenio; Wells, James Allen; Estell, David Aaron; Henner, Dennis James
PATENT ASSIGNEE(S): Genentech, Inc., USA
SOURCE: Eur. Pat. Appl., 79 pp.
CODEN: EPXXDW
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 6
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
EP 130756	A1	19850109	EP 1984-304252	19840622	<--
EP 130756	B1	19910206			
EP 130756	B2	20000628			
R: AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE					
US 4760025	A	19880726	US 1984-614612	19840529	<--
AU 8429568	A1	19850103	AU 1984-29568	19840620	<--
AU 587960	B2	19890907			
ZA 8404716	A	19850227	ZA 1984-4716	19840621	<--
DK 8403059	A	19850218	DK 1984-3059	19840622	<--
JP 60070075	A2	19850420	JP 1984-129928	19840622	<--
ES 533645	A1	19860216	ES 1984-533645	19840622	<--
EP 246678	A1	19871125	EP 1987-200690	19840622	<--
EP 246678	B1	19930428			
R: AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE					
EP 247647	A1	19871202	EP 1987-200689	19840622	<--
EP 247647	B1	19910123			
R: AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE					
EP 357157	A2	19900307	EP 1989-202584	19840622	
EP 357157	A3	19900328			
R: AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE					
AT 60797	E	19910215	AT 1984-304252	19840622	
AT 60356	E	19910215	AT 1987-200689	19840622	
AT 88750	E	19930515	AT 1987-200690	19840622	
ES 545148	A1	19860716	ES 1985-545148	19850712	<--
ES 545147	A1	19861216	ES 1985-545147	19850712	<--
AU 8937149	A1	19891123	AU 1989-37149	19890628	
AU 631797	B2	19921210			
AU 8937208	A1	19891207	AU 1989-37208	19890629	
AU 636109	B2	19930422			
US 5441882	A	19950815	US 1990-521010	19900509	
US 34606	E	19940510	US 1990-556918	19900720	
US 5310675	A	19940510	US 1991-805605	19911210	
US 5244791	A	19930914	US 1992-902542	19920622	
US 5352594	A	19941004	US 1992-908596	19920630	
US 5411873	A	19950502	US 1992-928697	19920811	
US 5346823	A	19940913	US 1993-36592	19930324	
DK 9300822	A	19930708	DK 1993-822	19930708	
DK 9300823	A	19930708	DK 1993-823	19930708	
US 5371008	A	19941206	US 1993-90472	19930712	
US 5371190	A	19941206	US 1993-90902	19930712	
JP 06315378	A2	19941115	JP 1993-244837	19930930	
JP 06319534	A2	19941122	JP 1993-244823	19930930	
JP 2889095	B2	19990510			

L19 ANSWER 2 OF 30 HCAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 1990:453297 HCAPLUS
DOCUMENT NUMBER: 113:53297
TITLE: Construction of a **Bacillus** subtilis mutant-**deficient** in three extracellular **proteases**
AUTHOR(S): Wang, Lin Fa; Bruckner, Reinhold; Doi, Roy H.
CORPORATE SOURCE: Dep. Biochem. Biophys., Univ. California, Davis, CA, 95616, USA
SOURCE: Journal of General and Applied Microbiology (**1989**), 35(6), 487-92
CODEN: JGAMA9; ISSN: 0022-1260
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The extracellular neutral proteinase gene nprE, alkaline proteinase gene aprE, and serine proteinase gene epr were sequentially mutated in B. subtilis. Site-specific mutagenesis was used in isolation of the triple mutant which produced .apprx.1% of extracellular proteinase of the wild-type.

TI Construction of a **Bacillus** subtilis mutant-**deficient** in three extracellular **proteases**

L19 ANSWER 5 OF 30 HCAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 1989:133717 HCAPLUS
DOCUMENT NUMBER: 110:133717
TITLE: Bacillus subtilis mutants with decreased extracellular protease activity, and protein manufacture and secretion with these strains
INVENTOR(S): Furutani, Yoshio; Honjo, Masaru; Nakayama, Akira; Kawamurs, Koichi; Shimada, Hiroaki; Mita, Izumi; Akaoka, Akiko
PATENT ASSIGNEE(S): Agency of Industrial Sciences and Technology, Japan
SOURCE: Fr. Demande, 23 pp.
CODEN: FRXXBL
DOCUMENT TYPE: Patent
LANGUAGE: French
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
FR 2604726	A1	19880408	FR 1987-13672	19871002	<--
FR 2604726	B1	19901221			
JP 63087975	A2	19880419	JP 1986-233285	19861002	<--
JP 05022508	B4	19930329			
GB 2198439	A1	19880615	GB 1987-23033	19871001	<--
GB 2198439	B2	19901010			
US 5084383	A	19920128	US 1990-553356	19900718	
JP 07298894	A2	19951114	JP 1992-301635	19921015	
JP 2857730	B2	19990217			

PRIORITY APPLN. INFO.: JP 1986-233285 19861002
US 1987-102439 19870929

AB A B. subtilis strain with decreased extracellular **protease** activity is produced by inserting a **Bacillus** gene for stimulation of extracellular **protease** levels into the genomic DNA of a strain which already displays reduced extracellular **protease** activity. The extracellular **protease** activity is thereby reduced still further. This strain is used for high-level production of proteins, e.g. human growth hormone. B. subtilis MT-400, a strain **deficient** in neutral and alkaline extracellular **proteases**, was transformed with pNP181, a plasmid containing a gene which stimulates level of extracellular **proteases**. Strain MT-430, in which the gene had been integrated into the B. subtilis genome, was isolated. A plasmid containing the human growth hormone gene inserted into the neutral extracellular **protease** gene of B. amyloliquefaciens (phGH427) was prepared Strain MT-430 transformed with this plasmid produced 205 mg growth hormone/L culture.

TI Bacillus subtilis mutants with decreased extracellular protease activity, and protein manufacture and secretion with these strains

L19 ANSWER 6 OF 30 HCAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 1989:129892 HCAPLUS
DOCUMENT NUMBER: 110:129892
TITLE: Production by recombinant DNA techniques of thermo- and pH-stable subtilisin analogs
INVENTOR(S): Stabinsky, Yitzhak; Zukowski, Mark M.
PATENT ASSIGNEE(S): AMGEN, USA
SOURCE: PCT Int. Appl., 57 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE	
WO 8704461	A1	19870730	WO 1987-US27	19870107	<--
W: AU, DK, FI, JP, NO					
RW: AT, BE, CH, DE, FR, GB, IT, LU, NL, SE					
AU 8769398	A1	19870814	AU 1987-69398	19870107	<--
AU 604476	B2	19901220			
EP 254735	A1	19880203	EP 1987-900930	19870107	<--
EP 254735	B1	19910619			
EP 254735	B2	19980617			
R: AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE					
JP 63502396	T2	19880914	JP 1987-500857	19870107	<--
AT 64617	E	19910715	AT 1987-900930	19870107	
DK 8704765	A	19870911	DK 1987-4765	19870911	<--
FI 8703980	A	19870914	FI 1987-3980	19870914	<--
NO 8703839	A	19871116	NO 1987-3839	19870914	<--
NO 176844	B	19950227			
NO 176844	C	19950607			
US 5399283	A	19950321	US 1991-637972	19910109	

PRIORITY APPLN. INFO.:

US 1986-819241	19860115
EP 1987-900930	19870107
WO 1987-US27	19870107
US 1988-193233	19880506
US 1989-366357	19890615

AB Mutated subtilisin having improved pH and thermal stability useful in washing composition formulation is provided where the sequence Asn-Gly in the enzyme is altered by deletion, or replacement with another amino acid, of one or both of the residues. Plasmids pAMB113 and pAMB301 were constructed containing a mutated (by site-specific mutagenesis) **Bacillus** subtilis aprA gene (where the asparagine in position 218 is replaced with serine) for transformation of, or integration into the chromosome of, a B. subtilis mutant **deficient** in secreting **proteases** other than the recombinant subtilisin. The recombinant subtilisin showed ≥3-fold increase in stability at pH 10 and also at 60°.

TI Production by recombinant DNA techniques of thermo- and pH-stable subtilisin analogs

L19 ANSWER 7 OF 30 HCAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 1988:523812 HCAPLUS
DOCUMENT NUMBER: 109:123812
TITLE: Cloning and expression of calf stomach prochymosin cDNA in Bacillus
INVENTOR(S): Hofemeister, Juergen; Hofemeister, Brigitte; Speter, Wolfgang; Liebscher, Dierck Hartmut; Steinborn, Gerhard
PATENT ASSIGNEE(S): Akademie der Wissenschaften der DDR, Ger. Dem. Rep.
SOURCE: Ger. (East), 8 pp.
CODEN: GEXXA8
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DD 253641	A1	19880127	DD 1985-273094	19850207 <--

PRIORITY APPLN. INFO.: DD 1985-273094 19850207

AB Recombinant calf stomach prochymosin is produced by **Bacillus** transformed with a plasmid containing prochymosin cDNA under control of a promoter from B. amyloliquefaciens, was constructed. **Protease-deficient** B. subtilis transformed with this plasmid produced protein which was recognized by anti-chymosin antibody and which displayed milk-clotting activities. This process provides a ready source of chymosin for cheese-making.

TI Cloning and expression of calf stomach prochymosin cDNA in Bacillus

US 5972682	A	19991026	US 1994-212291		19940314
US 5472855	A	19951205	US 1994-287964		19940922
US 5939315	A	19990817	US 1995-432279		19950501
US 5652136	A	19970729	US 1995-488096		19950607
US 5700676	A	19971223	US 1995-486746		19950607
US 5763257	A	19980609	US 1995-485375		19950607
US 5801038	A	19980901	US 1995-485827		19950607
US 5955340	A	19990921	US 1995-485313		19950607
US 6465235	B1	20021015	US 1997-994032		19971218
PRIORITY APPLN. INFO.:			US 1983-507419	A	19830624
			US 1984-614491	A	19840529
			US 1984-614612	A	19840529
			US 1984-614615	A	19840529
			US 1984-614616	A	19840529
			US 1984-614617	A	19840529
			EP 1984-304252	P	19840622
			EP 1987-200689	A	19840622
			EP 1987-200690	A	19840622
			US 1986-846627	B1	19860401
			US 1986-858594	B2	19860430
			US 1986-866389	B1	19860522
			US 1986-905363	B2	19860909
			US 1987-35652	B2	19870406
			US 1987-86869	B2	19870821
			US 1987-91235	B1	19870831
			US 1987-92976	B1	19870903
			US 1987-127134	B2	19871201
			US 1988-287316	B1	19881219
			US 1989-334081	A1	19890404
			US 1989-352326	B1	19890515
			US 1990-488433	B1	19900227
			US 1990-521010	A1	19900509
			US 1990-540868	B1	19900614
			US 1991-668311	B1	19910311
			US 1991-747459	B1	19910812
			US 1992-823039	B3	19920114
			US 1992-898382	B1	19920609
			US 1992-909999	B1	19920707
			US 1992-928697	A1	19920811
			US 1993-90902	A3	19930712
			US 1994-212291	A3	19940314
			US 1994-287964	A3	19940922

AB Carbonyl hydrolase genes of **Bacillus** subtilis and B. anyloliquefaciens are cloned and expressed, optionally after mutagenesis, in appropriate host cells, e.g. **protease-deficient** B. subtilis. B. subtilis subtilisin and neutral metalloproteinase genes and B. amyloliquefaciens subtilisin gene were cloned. The B. amyloliquefaciens gene was mutated and expressed in B. subtilis to produce subtilisins with altered substrate specificity, oxidation stability, and/or pH activity profile. These enzymes are useful in detergent compns. B. subtilis mutants lacking functional subtilisin and neutral **proteinase** genes were prepared

TI Recombinant manufacture of prokaryotic carbonyl hydrolases for use in detergents

L19 ANSWER 11 OF 30 HCAPLUS COPYRIGHT 2004 ACS on STN
ACCESSION NUMBER: 1987:132978 HCAPLUS
DOCUMENT NUMBER: 106:132978
TITLE: **Protease-deficient** **Bacillus** subtilis host strains for production of staphylococcal protein A
AUTHOR(S): Fahnestock, Stephen R.; Fisher, Kathryn E.
CORPORATE SOURCE: Genex Corp., Gaithersburg, MD, 20877, USA
SOURCE: Applied and Environmental Microbiology (**1987**), 53(2), 379-84
CODEN: AEMIDF; ISSN: 0099-2240
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Strains of B. subtilis were constructed which produced very low levels of extracellular proteases. These strains carried insertion or deletion mutations in the subtilisin [9014-01-1] structural gene (apr) which were constructed in vitro by using the cloned gene. The methods used to construct the mutations involved the use of plasmid vector which allowed the selection of chromosomal integrates and their subsequent excision by homologous recombination to effect replacement of the chromosomal apr gene by a derivative carrying an inactivating insert with a selectable marker (a cat gene conferring chloramphenicol resistance). The strains produced no subtilisin, no detectable extracellular metalloprotease activity, and residual extracellular serine protease levels as low as 0.5% of that of the standard strain from which they were derived. The strains proved to be superior host strains for the production of staphylococcal protein A, accumulating higher levels of intact protein than do previously available B. subtilis strains.

TI **Protease-deficient Bacillus** subtilis host strains for production of staphylococcal protein A